

Land Parameter Estimation Using Satellite Microwave Radiometry: Retrieval Issues

Eni Njoku and Steven Chan
Jet Propulsion Laboratory
California Institute of Technology
Pasadena, CA 91109

Abstract

During the coming decade satellite microwave radiometers are likely to be the primary means for acquiring global land surface soil moisture information. Planned launches of the Advanced Scanning Microwave Radiometers (AMSRs) on the EOS-Aqua and ADEOS-II satellites, and similar instruments to be launched as part of DoD and NPOESS programs, will provide a wealth of new C-band (~6.9 GHz) data. Plans are also in progress for a dedicated soil moisture mission that would provide global L-band (~1.4 GHz) passive and active (radar) data. Measurements at C-band and L-band are progressive steps in improving the capability to estimate soil moisture in the presence of vegetation cover, leading to more accurate retrievals over a larger percentage of the global land area. There are significant issues to be addressed in determining optimum approaches to utilization of the new data. These issues include direct retrieval of soil moisture, use of ancillary data, and assimilation of satellite data into hydrologic models. Radiative transfer model limitations, and lack of information on naturally occurring surface characteristics and variability, present problems in determining a-priori the errors to be expected due to roughness, vegetation, and surface temperature uncertainties. Combinations of data from several sources, including in-situ and satellite-based, are likely to provide the best results for estimation of land surface parameters.